Simplest Shortest Path First for Provisioning Optical Circuits in Dense Mesh Network Configurations

Abstract

A method for determining the shortest simplest path in a optical network with mixed DWDM transmission characteristics, mixed switching methodologies (i.e. micro mirrors, bubbles, Electronic TDM, Electronic cross bar, optical signal regeneration, and DWDM wavelength translation using optical devices). Disclosed in the invention is: a.) a multi-layered network path determination method that resolves over-constrained routing requirements, b.) an application of A that resolves routing constraints described for the optical networking environment, c.) A Dense Mesh simplification method that radically reduces the computation and processing power to find the best approximate path through the network, d.) A caching strategy to cache approximate paths rather than exact paths and to age out cache entries just before they become incorrect e.) A method of calculating multiple metrics and checking them against routing requirements during the path determination process rather than afterwards as is done usually f.) A method to turn an approximate path into an exact path that enforces simplest shortest path first and keys cache age out, g.) A method of filling cache entries that enforces simplest shortest path first

The "Simplest path" has no signal regenerators, wavelength translators, or use of electronic switching. Slightly simpler paths require a minimum number of signal regenerators, wavelength translators, or electronic switching. In general terms it is a path that can be completed at the lowest level possible first and then progressively falls back

to higher and higher levels to complete a path that meets routing requirements. "Simplest Shortest path" indicates that a longer path that is simpler has precedence of a "Shorter path" that has additional resource requirements.

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This Patent was developed independently of any Federally sponsored research. It is solely the work of Wallace Matthews of 41 Kinsley Lane, Mendon, Mass. Currently self employed and an independent inventor.

An example software listing is being supplied on CD Roms. The CDRom is CD-R machine Format produced on an IBM Compatible PC running Windows-2000 using the MicroSoft Windows NT file System formats. All files are Ascii Text files and viewable via any Unix or Windows compatible Text Editor. The files are Python Source code files with a ".py" extension. Python is the chosen language because it is very "readable" yet compact. For those not familiar with Python, it has many of the characteristics of Java, yet is easier for a novice programmer to learn and to understand.

File Names	File Size in Bytes	Original Creation Date
Route_1.py	15,000	6/17/2001 8:08PM
Route_common.py	3,000	6/17/2001 7:56PM
Policy.py	1,000	5/20/2001 9:59PM
Path.py	7,000	6/17/2001 2:37PM

Node.py	23,000	6/17/2001 7:36PM
Metric.py	16,000	6/2/2001 8:44PM
Link.py	24,000	6/17/2001 8:42PM
Cache.py	50,000	6/17/2001 8:29PM